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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/584,407	06/26/2006	Paul Joseph Brooks	0076091-000008	9864
21839 7590 06/04/2010 BUCHANAN, INGERSOLL & ROONEY PC POST OFFICE BOX 1404 ALEXANDRIA, VA 22313-1404			EXAMINER KHATRI, PRASHANT J	
			ART UNIT 1783	PAPER NUMBER
			NOTIFICATION DATE 06/04/2010	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No. 10/584,407	Applicant(s) BROOKS, PAUL JOSEPH	
	Examiner PRASHANT J. KHATRI	Art Unit 1783	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 March 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4,6-10,14-18,21 and 22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,6-10,14-18,21 and 22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

In response to Amendments/Arguments filed 3/29/2010. Claims 1, 4, 6-10, 14-18, and 21-22 are pending. Claims 1, 4, 6-10, and 14-18 were amended. Claims 11 and 19 were cancelled. Claims 21 and 22 were added as new.

Claim Objections

1. Claim 22 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 22 recites the limitation that the thermal control film is a metal-free film which fails to further limit claim 1 which recites a metal free thermal control film.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1, 4, 6-10, 14-18, and 21-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the

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application was filed, had possession of the claimed invention. Claim 1 recites the limitation of the "layers arranged to filter the radiation". While it is noted that it appears that Applicant has support for the light radiation causing the interference effects, there appears to be no support for the broad term "radiation". Claim 1 further recites the limitation of "infrared". Given that it appears the emission and absorbency is in the far infrared spectrum and not the entire infrared spectrum as shown in Figures 1 and 4 and throughout the specification. Examiner notes that in the near infrared wavelength spectrum, the light is reflected as shown in Figure 4. Claims 4, 6-10, 14-18, and 21-22 are further rejected as being dependent upon claim 1. Clarification is requested.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1, 4, 6-10, 14-18, and 21-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 1 recites the limitation "the metal free thermal control film" in the fourth line of the claim. There is insufficient antecedent basis for this limitation in the claim.

7. Claim 1 recites the limitation "the radiation" in the sixth line. There is insufficient antecedent basis for this limitation in the claim. Further, it is not clear what is meant by the term "radiation" in terms of what is radiating with respect to the "radiating element". It appears that "radiation" refers to thermal radiation based upon the last line of the claim and will be examined as such. Clarification is requested.

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8. Claim 1 recites the limitations of "high absorbency and emissive characteristics", "low absorbency characteristics", and "high transmissive characteristics". It is not clear what would be considered high or low in regards to the above material characteristics.

9. Concerning claims 7-8 and 15-18, it is noted that silicon oxide, silicon oxynitride, and silicon nitride are considered to be metalloids or semi-metallic materials. Examiner notes that Applicant has recited in claim 1 that the thermal control film is to be "metal free" which contains non-metallic layers. Given that Applicant has argued that metalloids or semi-metallic materials are considered to be metal-based, it is not clear how the thermal control film would remain metal free if silicon nitrides and silicon oxides are substituted. Claims 4, 6-10, 14-18, and 21-22 are further rejected as being dependent upon claim 1. Clarification is requested.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1, 4, 6, 9-10, 14, and 21-22 rejected under 35 U.S.C. 103(a) as being unpatentable over Kuffer (**US 5327149**) in view of Jonza et al. (**US 5882774**) with evidence from Billings et al. (**Journal article**), Pauly (**Journal article**), and 3M™ Radiant Mirror Film VM2000F1A6 Product Sheet (**Hereafter "Product Sheet"**).

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12. Kuffer discloses an RF transparent RF/UV-IR detector apparatus comprising an RF antenna, optical system, and multilayer dielectric coatings disposed upon at least a mirror which is located upon the antenna face (**FIGS. 1A, 1B, and 6; col. 5 bridged to 6, lines 57+; col. 8, lines 1+**). Concerning claim 1, Kuffer discloses the multilayer dielectric coating is comprised of stibnite and chiolite and the resultant dielectric constant and thickness is chosen as such to result in the desired optical effect of constructive interference and further discloses another embodiment wherein the coating is reflective to a first wavelength band and then substantially transparent to a second wavelength band (**col. 8, lines 17+**). As shown in Figures 4 and 7, the coating is nearly 100% reflective in the wavelength of about 3.5 to 8.5 microns and then transmissive at wavelengths greater than that. Given that is not clear what is meant by "high absorbency and emissive characteristics", Examiner takes the position that the disclosure of Kuffer would meet the present limitations. The multilayer dielectric filter also allows for transmission of RF energy (**col. 6, lines 3+**). As evidenced by Pauly, chiolite has a refractive index of about 1.34-1.35 (**p. 98, Table 1**) and Billings discloses the refractive index of stibnite is from about 2.43-2.5 (**abstract**). Given that Kuffer discloses dielectric constant is adjusted to allow for reflection in a specific wavelength range, which is known in the art to correspond towards the refractive index and the materials as disclosed form a multilayer coating, it would have been obvious to form the laminate by alternating high and low refractive index materials at a specified thickness to form a laminate having the presently claimed transmissivities and absorbencies. However, Kuffer is silent to the use of polymeric multilayer stacks as interference filters.

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13. Jonza et al. disclose a multilayer optical film (**abstract**). Concerning claims 1, 4, and 6 Jonza et al. disclose the multilayer optical film allows for construction of mirrors and polarizers wherein said multilayer optical film are comprised of alternating layers of PEN and coPEN wherein the PEN and coPEN for example, and have different refractive indices (**FIG. 1b; col. 2 bridged to 3, lines 63+; col. 5, lines 28+; col. 10-12, lines 31+**). Examiner notes that the desired refractive index relationships can be established by combining a first material that is crystalline or semi-crystalline with a second material that is crystalline, semi-crystalline, or amorphous by stretching during or after film formation, extruding, or coating (**col. 16-17, lines 39+**). Jonza further discloses that optical properties such as reflectance and polarization vary depending upon the stretching as the stretching goes from uniaxial to biaxial stretching (**col. 3, lines 1+; col. 5, lines 28+; col. 10-12, lines 31+**). Specifically, it is noted that Jonza discloses stretch rate, stretch ratio, and stretch temperature are among the variables that one of ordinary skill in the art could adjust to form the desired optical properties (**col. 18, lines 1+**). Regarding claim 4, it is noted that since the material as disclosed by Jonza is comprised of the materials as presently claimed in claim 1 (i.e. alternating high/low refractive indices non-metallic layers), the material would be intrinsically flexible. Concerning claims 9-10, Examiner notes that optical properties are known within the art to be strongly influenced by optical thicknesses which is a parameter based upon the physical thickness of each layer. Given the above disclosure, one of ordinary skill in the art by routine experimentation would be able to determine the thickness of the total stack depending upon the desired optical characteristics. See *In re Boesch*, 617 F.2d 272,

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205 USPQ 215 (CCPA 1980). Thus, it would have been obvious to one of ordinary skill in the art to form the appropriate thickness depending upon the desired optical properties. As evidence by the Product Sheet which discloses a mirror film that is comprised of a film that is similar to that used in the present invention and in Jonza and has wavelength transmission in the near wavelength range as that used in the present invention and an optical reflectivity in the visible light above 95% (**Table**). The mirror film is metal free and thus is non-corroding and non-conductive (**Table**). While it is noted that the mirror film of the Product Sheet is silent to some of the presently claimed material characteristics, it is noted that the disclosure of Jonza explicitly recites that optical properties are dependent upon the processing and optical thickness parameters. As such, it is clear that one of ordinary skill in the art, in order to produce the desired optical performance of a mirror film, would by routine experimentation have produced the presently claimed material properties depending upon the application. See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Concerning the present limitation of the film stack allowing heat to be dissipated, it is noted that since the combined disclosure appears to be the same as that presently claimed, the film would intrinsically allow for heat to be dissipated by means of the active face. The resultant film as shown by Jonza is metal-free and would thereby meet the limitations of claims 1 and 22. Concerning claim 21, it is noted that the application of a liquid coating to form the film stack is considered a product-by-process given that the resultant film forms a multilayer stack wherein the material limitations can be met by either process. Although Jonza et al. does not disclose applying the interference stack as a liquid onto the substrate, it is

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noted that “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process”, *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Further, “although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product”, *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir.1983). See MPEP 2113.

Therefore, absent evidence of criticality regarding the presently claimed application as a liquid coating and given that Jonza meets the requirements of the claimed composite, Jonza clearly meet the requirements of present claim 21.

14. All of the elements were known in the art. The only difference is a single disclosure containing all of the presently claimed elements. Kuffer discloses an RF transparent RF/UV-IR detector apparatus comprising an RF antenna, optical system, and multilayer dielectric coatings disposed upon at least a mirror which is located upon the antenna face. However, Kuffer is silent to the use of polymeric multilayer stacks as interference filters. Jonza et al. disclose a multilayer optical film that can be used in constructing mirrors containing only polymeric material. The mirrors are formed by varying the stretch ratio (i.e. uniaxial stretching to biaxial stretching), set temperatures, and other known parameters to form the desired optical performance properties. While

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it is noted that the mirror film of the Product Sheet is silent to some of the presently claimed material characteristics, it is noted that the disclosure of Jonza explicitly recites that optical properties are dependent upon the processing and optical thickness parameters. As such, it is clear that one of ordinary skill in the art, in order to produce the desired optical performance of a mirror film, would by routine experimentation have produced the presently claimed material properties depending upon the application and thereby allow for heat to be dissipated. Further, it is noted that such a mirror film is metal free and thus, will not corrode in corrosive environments. Given that the multilayer stack of Kuffer serves as a interference stack for reflecting a portion of the desired wavelength range and Jonza with evidence from the Product Sheet disclosing a polymer stack that can be formed into a mirror film that reflects certain wavelengths, it would have been obvious to one of ordinary skill in the art to substitute the interference film of Jonza with the interference film of Kuffer in order to increase resistance to corrosion while maintaining the desired optical properties.

15. Claims 7-8 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuffer (**US 5327149**) in view of Jonza et al. (**US 5882774**) with evidence from Billings et al. (**Journal article**), Pauly (**Journal article**), and 3M™ Radiant Mirror Film VM2000F1A6 Product Sheet (**Hereafter "Product Sheet"**) as applied to claims 1 and 14 above, and further in view of Iacovangelo et al. (**US 6587263**).

16. Kuffer and Jonza disclose the above; however, prior art is silent to the filter comprising a silicon-based material.

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17. Iacovangelo et al. disclose optical solar reflectors comprising a substrate, bond layer coating, reflective coating, and radiative layer (**abstract**). Concerning claims 7-8 and 15-16, Iacovangelo et al. disclose the radiative layer is comprised of silicon oxide, silicon nitride, and silicon oxynitride in which the refractive index profile can be modulated to control the amplitude, bandwidth, and wavelength of the rejection bands (**abstract; col. 2, lines 35+**). The thickness of this layer is from 10 to 25 microns (**col. 2, lines 41+**). As shown by Iacovangelo, the radiative layer allows for improved emissivity and absorbency in wavelengths from 200 nm to 2500 nm and far infrared regions (**col. 2, lines 42+**). Regarding the limitation of a plurality of tiles, Iacovangelo et al. disclose the radiative layer is deposited to plates having a reflective layer used in spacecrafts (**col. 4, lines 50+**). The radiative layer comprising such materials allows for improved interfacial CTE matching during thermal cycling, improved optical performance at different wavelengths, and thermal properties (**col. 2, lines 35+**).

18. All of the elements were known in the art. The only difference is a single disclosure containing all of the presently claimed elements. Kuffer and Jonza disclose the above; however, prior art is silent to the filter comprising a silicon-based material. Iacovangelo et al. disclose optical solar reflectors comprising a substrate, bond layer coating, reflective coating, and radiative layer. Given that Iacovangelo et al. disclose the radiative layer comprising silicon oxide, silicon nitride, and silicon oxynitride has improved optical performance in certain wavelengths during thermal cycling, it would have been obvious to one of ordinary skill in the art to use the materials of Iacovangelo et al. in order to improve optical performance in the desired wavelengths.

Response to Arguments

19. Regarding the Request for Information regarding the Product Sheet, it is noted that Applicant has admitted that the disclosure as prior art and as such, considered to be applicable to the present claims.

20. Applicant's arguments, see pp. 5-8, filed 3/29/2010, with respect to the 35 USC 112, 2nd paragraph rejection of claims 1, 4, 6-11, and 14-20 have been fully considered and are persuasive. The rejection of the above claims has been withdrawn. While it is noted that the rejection regarding the terms "high" and "low" with respect to the refractive indices is considered persuasive, it is noted that the terms with respect to the absorbance, emissivity, and transmissivity are considered indefinite. The terms "high" and "low" are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Examiner notes that within the specification, Applicant has only recited a 3M™ Multilayer sheet having similar properties as the Product Sheet cited above in the wavelength ranges disclosed by the Product Sheet and not within the presently claimed ranges. Given that the specification provides no examples and the Product Data Sheet only discloses a film that is similar to that found within the specification at wavelength ranges different from that presently claimed, it is not clear what is considered to be "high" or "low" with respect to the presently claimed multilayer stack.

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21. Applicant's arguments, see pp. 9-10, filed 3/29/2010, with respect to the 35 USC 103(a) rejection of claims 1, 4, 6, and 9-10 under Jonza et al. with evidence from the Product Sheet have been fully considered and are persuasive. The rejection of the above claims has been withdrawn. However, upon further reconsideration, Jonza and the Product sheet are still applicable to the present claims with regards to the interference stack. Regarding the Jonza reference and the Product sheet, Applicant asserts that the Product Sheet could not be used in space applications. Examiner notes that the present claims do not disclose any use in space applications. Furthermore, it is noted that Jonza in combination with the Product Sheet discloses forming various interference stacks for the desired optical effects by means of stretching and thickness. Examiner further notes that Applicant appears to recite that one of ordinary skill in the art could customize films by 3M™ and other manufactures for the desired specifications required. As such, the references of Jonza and the Product Sheet are still applicable as secondary references.

22. Applicant's arguments, see pp. 10-12, filed 3/29/2010, with respect to the Lepore reference have been fully considered and are persuasive. The rejection of the claims under the Lepore reference has been withdrawn. Examiner notes that the present claims recite functional language that appears to overcome the previous rejection.

Conclusion

23. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PRASHANT J. KHATRI whose telephone number is (571)270-3470. The examiner can normally be reached on M-F 8:00 A.M.-5:00 P.M. (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Sample can be reached on (571) 272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Patricia L. Nordmeyer/
Primary Examiner, Art Unit 1783

PRASHANT J KHATRI
Examiner
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